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PATENT CLAIMS

1. Cartridge case (2) and ammunition round (1) primarily for electrothermal and/or electrothermochemical weapon systems, which round (1) comprises the said cartridge case (2), characterized in that the casing (10) of the cartridge case (2) comprises or consists of one or more insulated or insulating shells, layers or surfaces (11, 12, 13) for, at least electrically, insulating the casing (10) of the cartridge case (2) from the barrel (14) of the weapon system and also preferably from at least the bottom (16) and/or firing device (5) of the ammunition round (1) as well, but preferably also from the rest of the ammunition round (1), when the round (1) is used, and also preferably from at least the bottom (16) and/or firing device (5) of the ammunition round (1) as well, but preferably also from the rest of the ammunition round (1), when the round (1) is stored and handled.

2. Cartridge case (2) and ammunition round (1) according to Claim 1, characterized in that the casing (10) of the cartridge case (2) comprises a load-bearing case shell (11), for example in the form of a conventional cartridge case (2) manufactured from an electrically conductive metal, for example brass, and also at least one inner and/or outer coating, surface or layer (12, 13), of which at least the shell (11) or one inner and/or outer coating, surface or layer (12, 13) is dielectric for electric insulation of the case (2) in relation to at least the barrel (14) and preferably also to the bottom (16) and/or firing device (5) of the ammunition round (1), but preferably also to the rest of the ammunition round (1).

3. Cartridge case (2) and ammunition round (1) according to one of the preceding claims, characterized

in that the cartridge case (2) has a casing (10) which comprises at least one inner and/or outer coating, surface or layer (12, 13) which is a mechanically applied layer or a chemically or electrochemically applied surface.

4. Cartridge case (2) and ammunition round (1) according to any one of the preceding claims, characterized in that at least one inner and/or outer coating, surface or layer (12, 13) consists of a material applied by phase transformation, such as vaporization and condensation to form an insulating film (12, 13), preferably a dimeric or polymeric raw material comprising hydrocarbons, such as poly-para-xylylene or another suitable plastic.

5. Cartridge case (2) and ammunition round (1) according to any one of the preceding claims, characterized in that at least one inner and/or outer shell or layer (11, 12, 13) consists of shape-imitating shrink film or flexible tube (11, 12, 13) made of preferably non-conductive material, such as rubber or plastic.

6. Cartridge case (2) and ammunition round (1) according to any one of the preceding claims, characterized in that the casing (10) of the cartridge case (2) comprises or consists of a non-conductive or electrically insulating load-bearing material, shell, layer or surfaces (11, 12, 13), such as hard plastic, ceramic, rigid rubber, fibre composite etc.

7. Cartridge case (2) and ammunition round (1) according to any one of the preceding claims, characterized in that the casing (10) of the cartridge case (2) comprises or consists of a relatively flexible non-conductive or electrically insulating shell or layer (11, 12, 13) which is constructed from a glass-fibre laminate comprising woven glass-fibre fabric and

glass-fibre thread, for example glass-fibre-reinforced epoxy in the form of a case jacket (15) wound in a number of plies.

8. Cartridge case (2) and ammunition round (1) according to Claim 7, characterized in that the casing (10) of the cartridge case (2) has a thread winding which is arranged along the case jacket (15) at a winding angle α defined for each ply to the longitudinal axis Y of the case (2), and which casing (10) includes several different thread-winding angles α for bringing about locking of the glass fibre, preferably at least 4 different angles α in relation to the longitudinal axis Y of the case (2).

9. Cartridge case (2) and ammunition round (1) according to any one of the preceding claims, characterized in that the firing device (5) is arranged detachably on a bottom (16) integrated with the casing (10) of the cartridge case (2) or on a separate bottom piece (16) arranged preferably demountably with the casing (10).

10. Cartridge case (2) and ammunition round (1) according to any one of the preceding claims, characterized in that the separate bottom piece (16) is manufactured with an interference fit to the cartridge case jacket (15) which is greater than the expansion possibility of the round (1) in the cartridge chamber plus the maximum compression which can be brought about by the inner overpressure when firing takes place.

11. Ammunition round (1) with cartridge case (2) according to any one of the preceding claims, characterized in that the round (1) also comprises at least one projectile (4), and, enclosed in the cartridge case (2), a propellent charge (7) which essentially follows the inner dimensions of the case (2).

12. Ammunition round (1) with cartridge case (2) according to Claim 5 in combination with Claim 11, characterized in that the shrink film or the tube (11, 12, 13) is arranged directly on the outside of the propellent charge (7).

13. Ammunition round (1) with cartridge case (2) according to Claim 12, characterized in that the propellent charge (7) consists of a cartridge-shaped charge which is surrounded by an outer shrink film or flexible tube (11, 12, 13) for forming a cartridge-shaped, and if appropriate vacuum-packed, round (1) which stands up to normal handling of the round (1).

14. Cartridge case (2) and ammunition round (1) according to any one of the preceding claims, characterized in that the bottom piece (16) is electrically non-conductive, suitably made of glass-fibre epoxy, and arranged on the rear end (6) of the casing (10) in a tight-fitting manner by means of screw-thread cutting, adhesive bonding or by means of another connection suitable for the function.

15. Cartridge case (2) and ammunition round (1) according to any one of the preceding claims, characterized in that the bottom (16) and/or the rear end (30) of the firing device (5) comprise(s) an electric connection (19), by means of which the ammunition round (1), once introduced into the chamber (17) of the weapon concerned, is in electric contact with the high-voltage source (18) of the weapon concerned via the firing device (5).

16. Ammunition round (1) with cartridge case (2) according to any one of the preceding claims, characterized in that the firing device (5) comprises an outer, electrically conductive metal combustion chamber (25) which is arranged projecting from and

detachably fastened to the rear end (6) of the cartridge case (2), and a central electrode (26) arranged inside the chamber, in that the central electrode (26) comprises a first, "input" electric connection (19a), in that the rear end (30) of the combustion chamber (25) comprises a second, "output" electric connection (19b), in that an electrically insulating device (32) is arranged between the said two, "input" and respectively "output", electric connections (19a, 19b) and along the entire length of the combustion chamber (25) between the said "input" electric connection (19a) and a front opening (28) arranged on the plasma torch (5), in that at least one but preferably more electric conductors extend inside the combustion chamber (25) and the electrically insulating device (32), between the first, "input" electric connection (19a) and the front opening (28) of the combustion chamber (25), the combustion chamber (25), the electric conductors and the central electrode (26) all being electrically conductive, as a result of which the current transfer path, the polarity of which can be changed, for the necessary current and voltage is therefore arranged so as to run from the first, "input" electric connection (19a) and on to the front opening (28) of the combustion chamber (25) via the electric conductors for ionization of these to form a very hot, expansive plasma, which squirts out through the said front opening (28), for igniting the propellent charge (7), and finally from the plasma and the front opening (28) of the combustion chamber (25) back to the "output" electric connection (19b) via the casing of the combustion chamber (25).

17. Ammunition round (1) with cartridge case (2) according to any one of Claims 1-14, characterized in that the firing device (5) of the ammunition round (1) can consist of a fuse for use of the cartridge case (2) and the ammunition round (1) in other more conventional

weapon systems than the said electrothermal and/or electrothermochemical weapon systems.

18. Method for manufacturing a cartridge case (2) and an ammunition round (1) primarily for electrothermal and/or electrothermochemical weapon systems, which round (1) comprises a cartridge case (2) according to any one of Claims 1-17, characterized in that at least one of the shells or layers (11, 12, 13) which form part of the casing (10) of the cartridge case (2) is manufactured by glass-fibre thread being wound with resin in thin layers with varying winding angles α sandwiched with woven glass-fibre fabric so that a plurality of winding plies/laminate layers (11, 12, 13) are obtained after hardening.

19. Method for manufacturing a cartridge case (2) and an ammunition round (1) according to Claim 18, characterized in that for every such winding ply/laminate layer (11, 12, 13), a fibre winding with fibre angles of essentially roughly 90° to the longitudinal axis of the tube on the inside and +/- roughly 15-25°, preferably +/- 20°, on the outside is selected, and in that a number of such winding plies (11, 12, 13) are laid on top of one another and sandwiched with woven glass-fibre fabric between a number of the thread-winding plies so that an essentially flexible case jacket (15) is obtained, as a result of which the casing (10) of a round (1) introduced into the cartridge chamber tolerates being expanded towards the walls of the cartridge chamber by the inner overpressure inside the cartridge case (2) brought about when firing takes place without for that reason cracking, delaminating or disintegrating.

20. Method for manufacturing a cartridge case (2) and an ammunition round (1) according to any one of Claims 1-18, characterized in that at least one of the shells or layers (11, 12, 13) which form part of the casing

(10) of the cartridge case (2) is manufactured by an innermost, tightly woven glass-fibre fabric first being applied to a winding and shaping tool which is rotated while the fabric is draped over it, the last piece of the woven glass-fibre fabric being laid so that a small overlap is formed, after which a first winding ply of glass-fibre thread in resin is wound with a fibre angle to the longitudinal axis of the tube of essentially 90°, followed by two or more winding plies of thread with a fibre angle, which is varied for the component plies, of on the one hand roughly +15-25°, preferably +20°, and on the other hand roughly -15-25°, preferably -20°, after which the subsequent, thin winding plies/laminate layers (11, 12, 13) are also given a fibre winding with a fibre angle to the longitudinal axis of the tube which varies between essentially roughly 90° and +/- roughly 15-25°, preferably +/- 20°, as the thickness of the casing (10) is built up to roughly half-thickness, after which woven glass-fibre fabric is sandwiched with fibre windings with a fibre angle of essentially 90° until full shell or layer (11, 12, 13) thickness has been achieved.

21. Method for manufacturing a cartridge case (2) and an ammunition round (1) according to any one of Claims 18, 19 or 20, characterized in that a relatively low winding speed is used, preferably roughly 4-6 m/min, while a relatively high thread tension, roughly 21-23 N/roving, and a hardening cycle which comprises a plurality of hardenings at increasing temperatures are selected.

22. Method for manufacturing a cartridge case (2) and an ammunition round (1) according to Claim 21, characterized in that use is made of a hardening cycle of roughly 5 hours at roughly 80°, followed by roughly 5 hours at roughly 120°, after which after-hardening takes place for roughly 4 hours at roughly 140°.

23. Method for manufacturing a cartridge case (2) and an ammunition round (1) according to any one of the preceding claims, characterized in that after shaping of a blank for the casing (10), this is cut and/or turned/ground to essentially the desired length, thickness and predetermined shape, after which a bottom piece (16) is mounted on the rear end (6) of the casing (10) in a tight-fitting manner, preferably by adhesive bonding or screw-thread cutting.

24. Method for manufacturing a cartridge case (2) and an ammunition round (1) according to any one of the preceding claims, characterized in that the bottom piece (16) is manufactured from glass-fibre epoxy, either by glass-fibre thread and/or woven glass-fibre fabric being given during shaping the form of a hammock where only tensile loads in the fibres can occur or by glass-fibre thread and/or woven glass-fibre fabric being given during shaping the form of a plane bottom so that pressure loads also can occur, after which the bottom piece (16), after shaping and hardening have been completed, is then turned out, attention being paid to obtaining the correct interference fit for the casing (10) concerned.

25. Method for manufacturing a cartridge case (2) and an ammunition round (1) according to any one of Claims 1-13, characterized in that the bottom piece (16) is manufactured from an electrically conductive material, suitably from metal.

26. Method for manufacturing a cartridge case (2) and an ammunition round (1) primarily for electrothermal and/or electrothermochemical weapon systems, which round (1) comprises a cartridge case (2) according to any one of the preceding claims, characterized in that an insulation coating (12, 13) is applied over all the shell or layer surfaces of the cartridge case (2) concerned which are accessible to gas by phase

transformation via a number of phases, a dimeric or polymeric raw material being vaporized so that the polymer or the dimer is first transformed from solid phase to gas phase and then, at a further increased temperature, is transformed to a reactive monomer gas which is made to condense and polymerize, a thin insulating plastic film layer (12, 13) being deposited on all the free surfaces of the cartridge case (2).

27. Method for manufacturing a cartridge case (2) and an ammunition round (1) according to Claim 26, characterized in that the condensation of the reactive monomer gas to form an insulating film (12, 13) takes place under low pressure, preferably in a vacuum.

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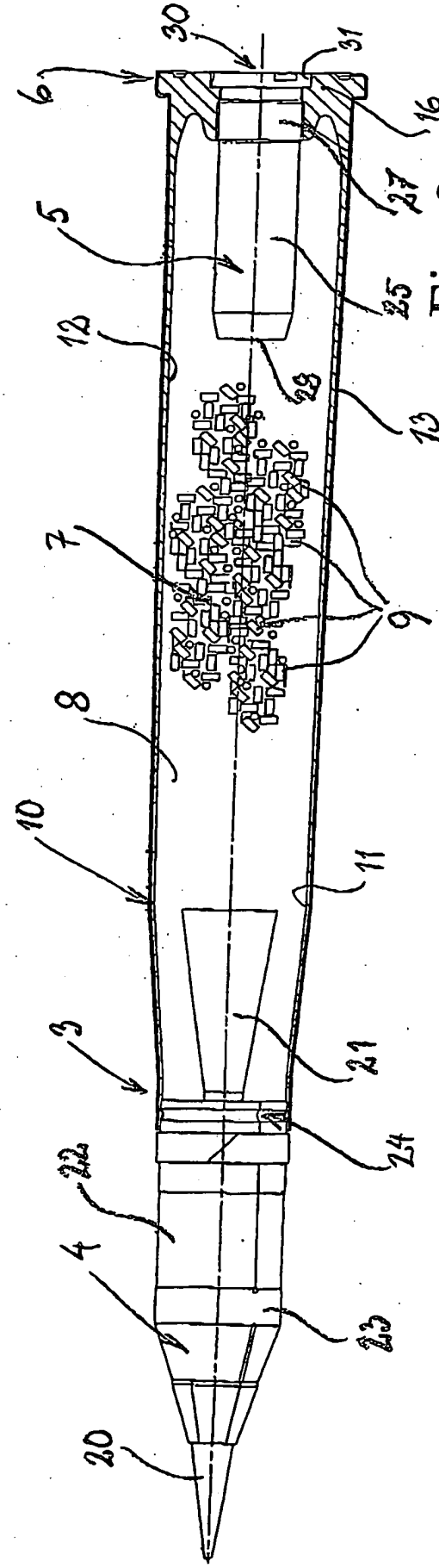

Fig. 2

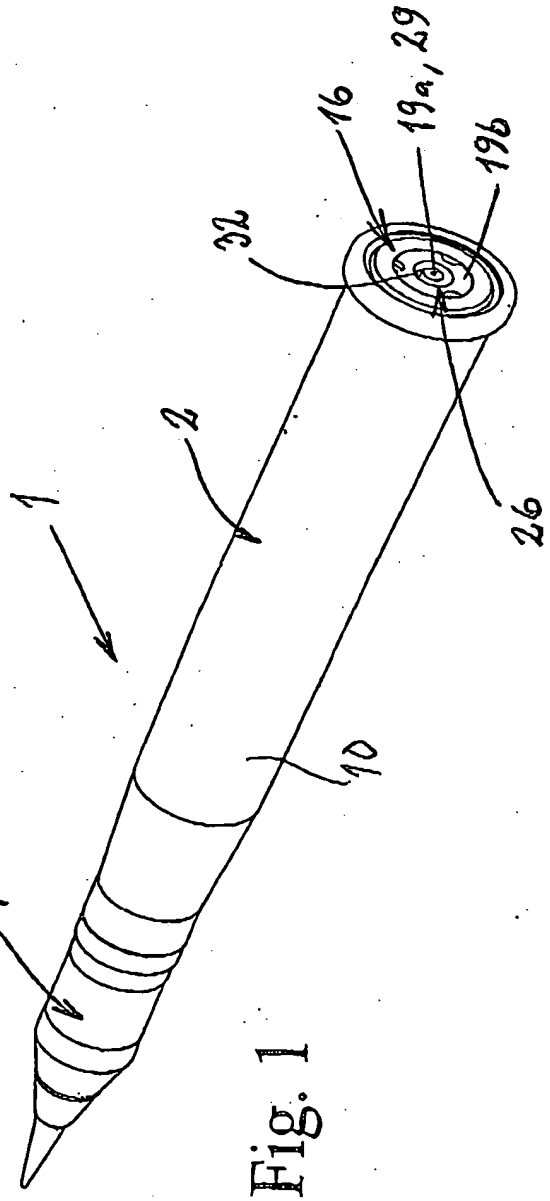

Fig. 1

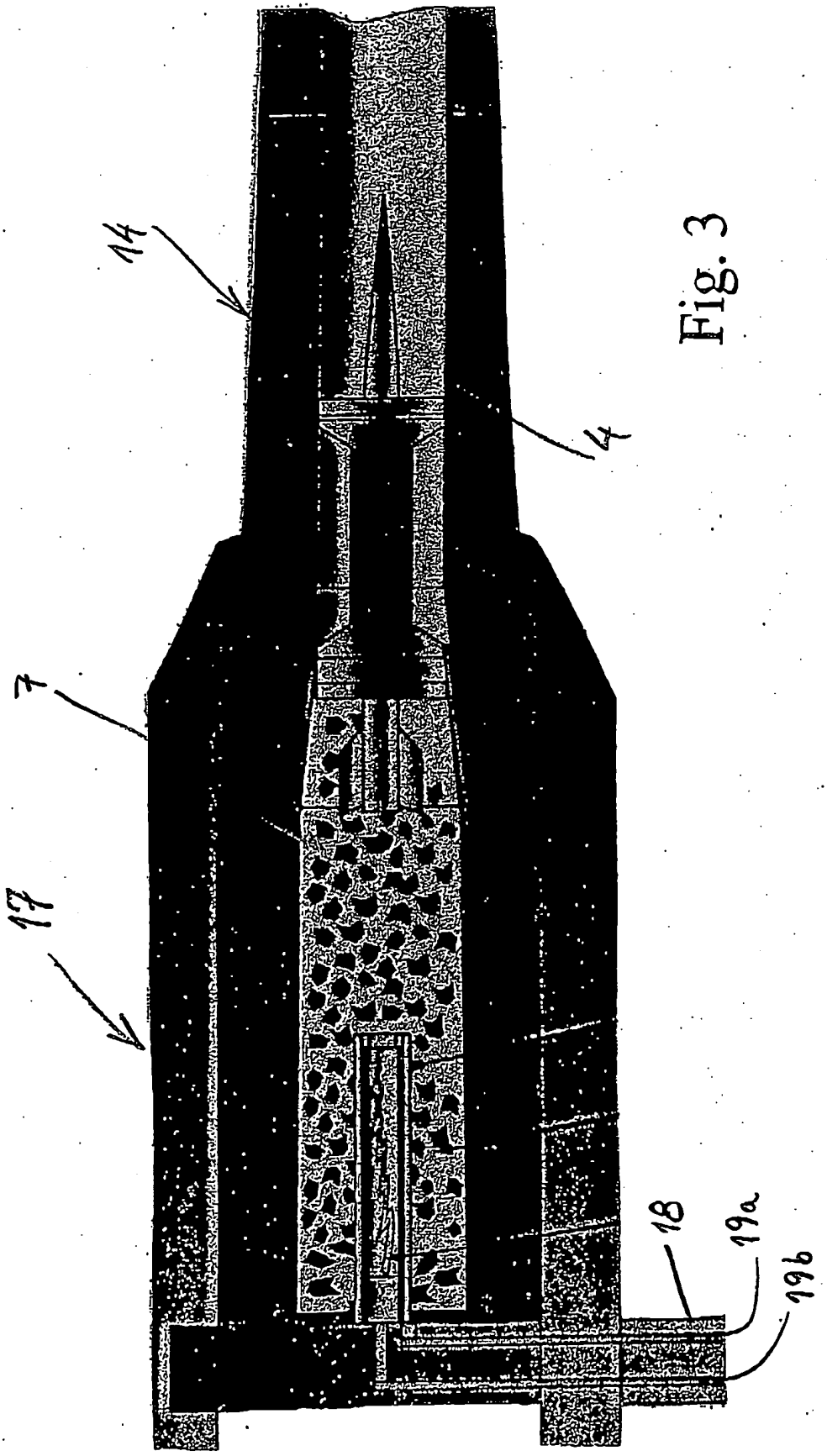

Fig. 3

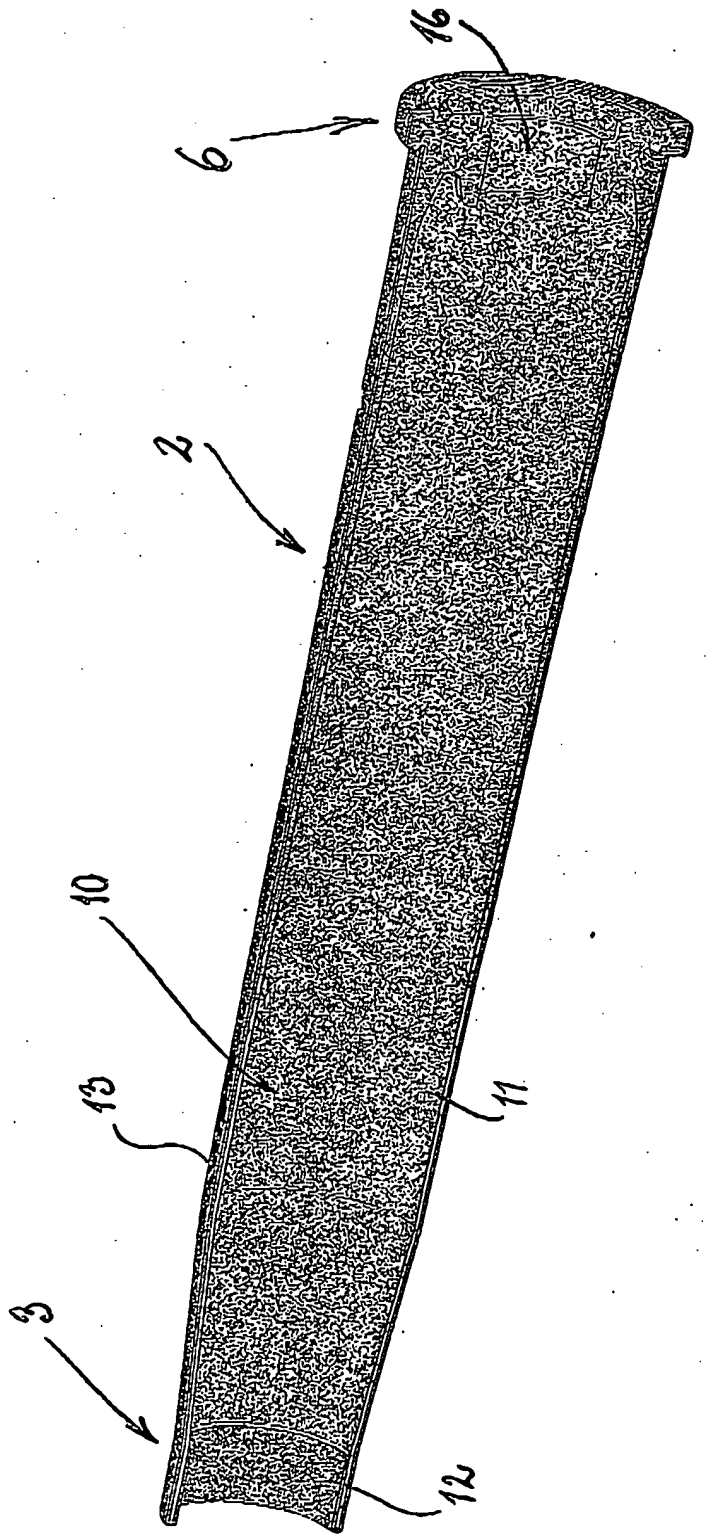

Fig. 4

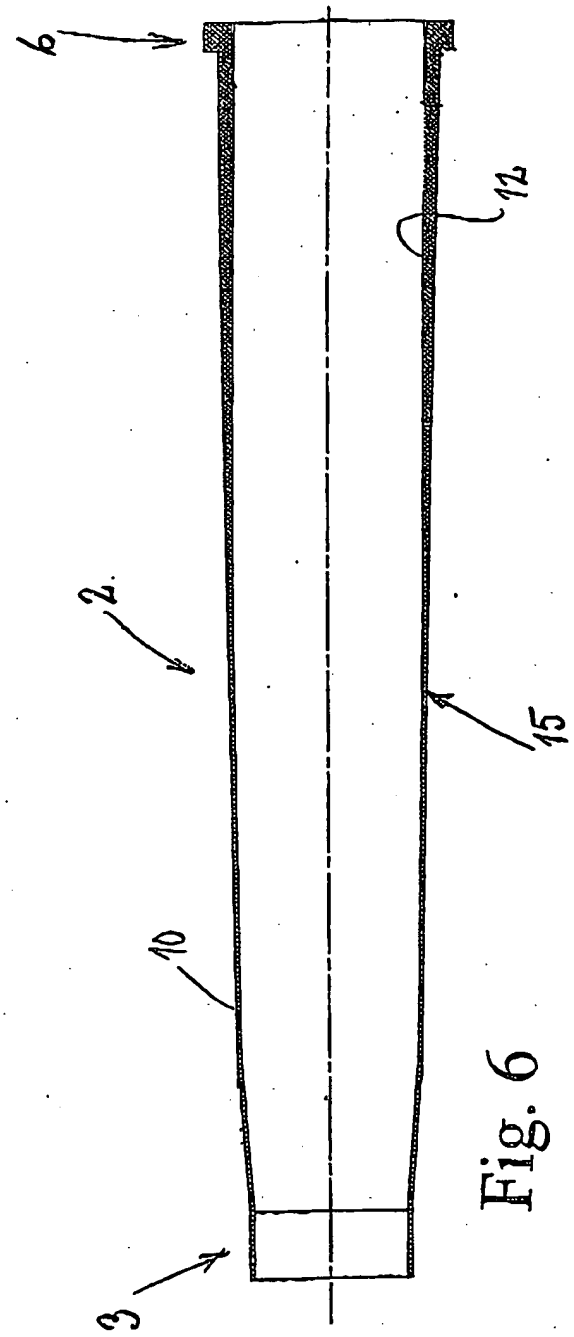

Fig. 6

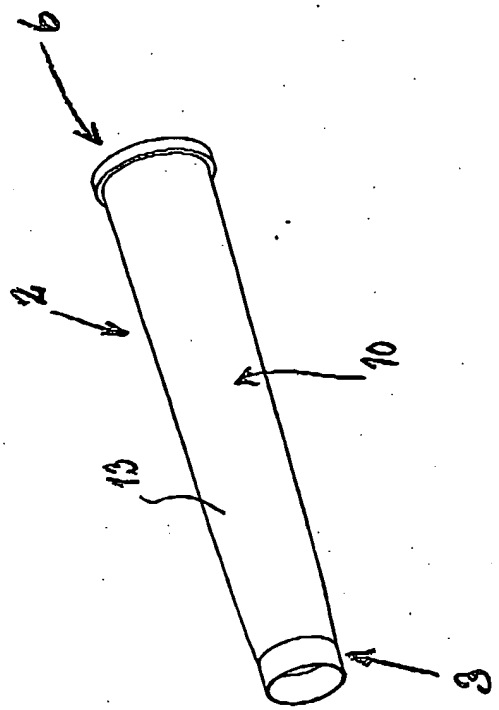

Fig. 5